

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A method for controlling inflation and deflation of spaced inflatable packer elements of a tubing conveyed straddle stimulation tool within a well casing of a well, the straddle stimulation tool having a packer pressure control member therein being moveable responsive to tubing pressure and casing pressure and being moveable by predetermined tubing applied tension force, said method comprising:

developing packer element inflation pressure within said straddle stimulation tool with tubing pressure and inflating the spaced inflatable packer elements for sealing thereof within the well casing and defining an isolated casing interval;

causing tubing pressure responsive positioning of said packer pressure control member for maintaining inflation of the spaced inflatable packer elements;

injecting well stimulation fluid through said straddle stimulation tool and into the isolated casing interval; and

after completion of well stimulation, applying sufficient tension force to said straddle stimulation tool via the tubing for moving said packer pressure control member by tubing applied tension force and releasing inflation pressure from the spaced inflatable packer elements and freeing said straddle stimulation tool for tubing conveyance within the well casing.

2. (Original) The method of claim 1, wherein a deflate shifter member is in moveable assembly with said straddle stimulation tool and has a tension force applying connection with said packer pressure control member, said deflate shifter member being connected with the fluid supplying and conveyance tubing, said method step of applying sufficient tension force comprising:

equalizing casing pressure across said spaced inflatable packer elements, and

with said spaced inflatable packer elements inflated, applying sufficient tension force via the fluid supplying and conveyance tubing to move said deflate shifter member and to move said packer pressure control member to a position for equalizing packer pressure with tubing pressure, thus deflating said spaced inflatable packer elements.

3. (Original) The method of claim 1, wherein said packer element pressure control member and said deflate shifter member having a lost-motion connection causing application of pulling force to said packer element pressure control member only after a pulling force has moved said deflate shifter member to force applying relation with said packer element pressure control member, said method comprising:

applying sufficient pulling force to said deflate shifter member via said tubing string to establish pulling force transmitting relation of said deflate shifter member with said packer element pressure control member and move said packer element pressure control member to said packer element deflate position.

4. (Currently amended) ~~The method of claim 1, wherein~~ A method for controlling inflation and deflation of spaced inflatable packer elements of a tubing conveyed straddle stimulation tool within a well casing of a well, the straddle stimulation tool having a packer pressure control member therein being moveable responsive to tubing pressure and casing pressure and being moveable by predetermined tubing applied tension force, said method comprising:

developing packer element inflation pressure within said straddle stimulation tool with tubing pressure and inflating the spaced inflatable packer elements for sealing thereof within the well casing and defining an isolated casing interval;

causing tubing pressure responsive positioning of said packer pressure control member for maintaining inflation of the spaced inflatable packer elements;

injecting well stimulation fluid through said straddle stimulation tool and into the isolated casing interval;

after completion of well stimulation, applying sufficient tension force to said straddle stimulation tool via the tubing for moving said packer pressure control member by tubing applied tension force and releasing inflation pressure from the spaced inflatable packer elements and freeing said straddle stimulation tool for tubing conveyance within the well casing;

disposing a spring member is disposed in force transmitting relation between a with said deflate shifter member and said straddle stimulation tool to urge and urges said deflate shifter member in a direction directing opposing said pulling force, said tubing being able to apply packer element pressure control member applying a pulling force to said packer element pressure control member only after having overcome the force of said spring member; and, said method comprising:

applying sufficient pulling force to said inflate shifter member via the tubing string to overcome the force of said spring member and move said packer element pressure control member to said packer element deflate position.

5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)
10. (Canceled)

11. (Currently amended) A straddle stimulation tool for isolating and stimulating selected formations in wells, comprising:

a tool body having spaced inflatable packer elements and defining a fluid injection passage having a fluid injection port located between said spaced inflatable packer elements, said tool body also defining an inflation flow passage in fluid communication with said spaced inflatable packer elements and defining an inflation control chamber and an inflation equalization port in communication with said inflation flow passage and said inflation control chamber;

a packer element pressure control member defining a stimulation fluid flow passage and being moveable within a said pressure control section between a pressure equalizing position at which said equalizing port is open and a pressure storing position at which said packer element pressure control member blocks fluid flow through said equalizing port;

a unidirectional valve member being located within said tool body and permitting unidirectional flow of stimulation fluid from said inflation control chamber to said inflation flow passage when said packer element pressure control member is located at said pressure storing position; and

a deflate shifter member being moveable relative to said tool body and having a tubing connector to which a fluid supplying and conveyance tubing string is connected, said deflate shifter member causing movement of said packer element pressure control member to said pressure equalizing position upon application of a tension force of predetermined magnitude to said deflate shifter by the fluid supplying and conveyance tubing string;

said packer element pressure control member being moveable from said pressure equalizing position to said pressure storing position responsive to the pressure of inflation fluid.

12. (Canceled)

13. (Original) The straddle stimulation tool of claim 11, comprising:

said packer element pressure control member defining a connection receptacle and a downwardly facing internal shoulder;

said deflate shifter member defining a flow passage in communication with the tubing string and having a connector extension being moveable within said connector receptacle, said connector extension defining an upwardly facing pulling shoulder establishing force transmitting engagement with said downwardly facing internal shoulder upon predetermined upward movement of said deflate shifter member by the tubing string and upon further upward movement said deflate shifter moving said packer element pressure control member to said pressure equalizing position.

14. (Original) The straddle stimulation tool of claim 13, comprising:

a deflate spring being located within said inflation control section and establishing a preload force urging said deflate shifter member downwardly;

said deflate shifter moving said packer element pressure control member upwardly from said pressure storing position to said pressure equalizing position only after overcoming the preload force of said deflate spring; and

after tubing pressure has been decreased for packer element deflation and packer element pressure has equalized with the decreased tubing pressure manipulation of the tubing string at the surface causing conveyance movement of said straddle stimulation tool upwardly or downwardly within the well.

15. (Currently amended) ~~The straddle stimulation tool of claim 11, comprising:~~ A straddle stimulation tool for isolating and stimulating selected formations in wells, comprising:

a tool body having spaced inflatable packer elements and defining a fluid injection passage having a fluid injection port located between said spaced inflatable packer elements, said tool body also defining an inflation flow passage in fluid communication with said spaced

inflatable packer elements and defining an inflation control chamber and an inflation equalization port in communication with said inflation flow passage and said inflation control chamber;

a packer element pressure control member defining a stimulation fluid flow passage and being moveable within a said pressure control section between a pressure equalizing position at which said equalizing port is open and a pressure storing position at which said packer element pressure control member blocks fluid flow through said equalizing port;

a unidirectional valve member being located within said tool body and permitting unidirectional flow of stimulation fluid from said inflation control chamber to said inflation flow passage when said packer element pressure control member is located at said pressure storing position;

a deflate shifter member being moveable relative to said tool body and having a tubing connector to which a fluid supplying and conveyance tubing string is connected, said deflate shifter member causing movement of said packer element pressure control member to said pressure equalizing position upon application of a tension force of predetermined magnitude to said deflate shifter by the fluid supplying and conveyance tubing string;

a force transmitting shoulder being defined by said packer element pressure control member; and

a piston ring being interposed between and in sealed relation with said packer element pressure control member and said tool body and engaging said force transmitting shoulder responsive to fluid pressure acting on said piston ring, said piston ring moving said pressure control member from said pressure equalizing position to said pressure storing position responsive to injection fluid pressure acting on said piston ring.

16. (Original) The straddle stimulation tool of claim 15, comprising:

a collet retaining said packer element pressure control member at said pressure equalizing position and said pressure storing position and releasing said packer element pressure control member for movement from said pressure equalizing position to said pressure storing position upon application of predetermined fluid flow responsive downward force of said piston ring, said collet releasing said packer element pressure control member for mechanically energized movement from said pressure storing position to said pressure equalizing position upon application of predetermined upward force thereto.

17. (Original) The straddle stimulation tool of claim 11, comprising:
said tool body defining an internal chamber to which tubing pressure is communicated;
an inflation control orifice being mounted to said tool body and establishing
communication of said internal chamber with an annulus between the tool body and a well
casing;
an inflate/inject piston being moveable within said internal chamber and having an
injection passage therethrough, said inflate/inject piston having a first position permitting flow of
fluid through said inflation control orifice and a second position blocking the flow of fluid
through said inflation control orifice; and
a spring member maintaining said inflate/inject piston at said first position.
18. (Original) The straddle stimulation tool of claim 11, comprising:
said tool body defining an equalizing piston chamber and defining an inject equalization
port communicating said equalizing piston chamber with the well casing;
an equalizing piston member being moveable within said equalizing piston chamber
responsive to pressure differential force and having a normal position equalizing injection
pressure with casing pressure, said equalizing piston member having an injection position
blocking said inject equalization port responsive to predetermined injection flow rate.
19. (Original) The straddle stimulation tool of claim 18, comprising:
a spring member maintaining an urging force on said equalizing piston member and
urging said equalizing piston member to said normal position thereof.